

We Claim:

1. A micro-electromechanical fluid ejection device that comprises
a substrate that defines a fluid inlet channel and incorporates a wafer and CMOS layers
positioned on the wafer;

5 a nozzle chamber structure that is positioned on the substrate to define a nozzle
chamber in fluid communication with the fluid inlet channel and a fluid ejection port in fluid
communication with the nozzle chamber;

an actuator that is connected to the CMOS layers and operatively positioned with
respect to the nozzle chamber, the actuator being displaceable on receipt of an electrical signal
10 from the CMOS layers to act on fluid in the nozzle chamber to eject fluid from the fluid
ejection port; and

a nozzle guard that is mounted on the substrate to be spaced from and cover the nozzle
chamber structure, the nozzle guard including a body member that defines a passage that is
aligned with the fluid ejection port so that fluid ejected from the fluid ejection port passes
15 through the passage.

2. A micro-electromechanical fluid ejection device as claimed in claim 1, in which the
nozzle guard includes support members that are fast with the substrate to support the body
member above the nozzle chamber structure.

20 3. A micro-electromechanical fluid ejection device as claimed in claim 2, in which the
support members define air inlet openings to permit air to be pumped into a region between the
nozzle chamber structure and the body member and to exit through the passage.

25 4. A micro-electromechanical fluid ejection device as claimed in claim 1, in which the
actuator is elongate and is connected at one end to the CMOS layers, an opposite end of the
actuator being displaceable towards and away from the substrate on receipt of an electrical
signal from the CMOS layers, the nozzle chamber structure including a nozzle that is
connected to said opposite end of the actuator, the nozzle having a crown portion and a skirt
30 portion that depends from the crown portion, the crown portion defining the fluid ejection port
and the skirt portion being positioned so that the nozzle and the wall define the nozzle

chamber, a volume of the nozzle chamber being reduced and subsequently enlarged as the nozzle is driven towards and away from the nozzle chamber by the actuator to eject fluid from the fluid ejection port.

5 5. A micro-electromechanical fluid ejection device as claimed in claim 4, in which an edge of the skirt portion is positioned adjacent an edge of the wall such that, when the nozzle chamber is filled with liquid, a meniscus is pinned by the edges of the skirt portion and the wall to define a fluidic seal that inhibits the egress of liquid from between the wall and the skirt as liquid is ejected from the fluid ejection port.

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6. A micro-electromechanical fluid ejection device as claimed in claim 4, in which the crown portion includes a rim that defines the fluid ejection port, the rim providing an anchor point for a meniscus that is formed in the fluid ejection port when the chamber is filled with liquid.

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7. A micro-electromechanical fluid ejection device which comprises
a substrate that defines a plurality of fluid inlet channels and incorporates a wafer and CMOS layers positioned on the wafer;

nozzle chamber structures that are positioned on the substrate to define nozzle
20 chambers in fluid communication with respective fluid inlet channels and fluid ejection ports in fluid communication with respective nozzle chambers;

actuators that are connected to the CMOS layers and operatively positioned with
respect to respective nozzle chambers, the actuators being displaceable on receipt of an
electrical signal from the CMOS layers to act on fluid in the respective nozzle chambers to
25 eject fluid from the fluid ejection ports; and

a nozzle guard that is mounted on the substrate to be spaced from and cover the nozzle
chamber structures, the nozzle guard including a body member that defines passages that are
aligned with respective fluid ejection ports so that fluid ejected from the fluid ejection ports
passes through the passages.

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